Overview
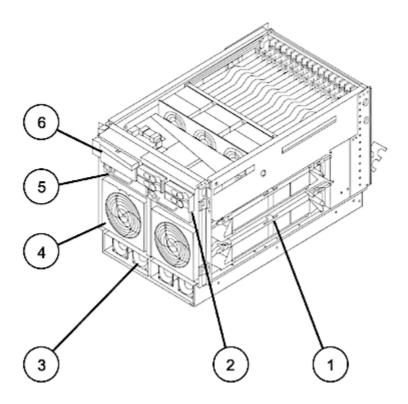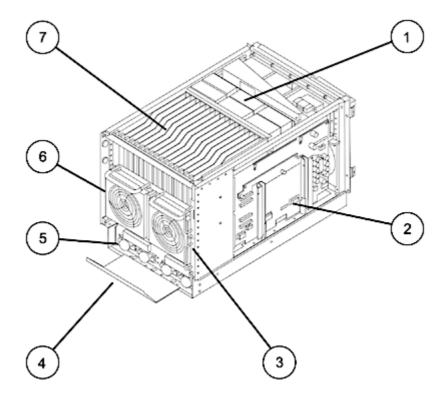

1. Cell Boards (2)
2. Hot-plug disks (4)
3. 2N redundant hot-swap system power (2)
4. N+1 redundant hot-swap fans (2)
5. 2 Independent PCI power supplies
6. Removable DVD or DAT

Overview

1. N+1 PCI cooling fans
2. System backplane (right side)
3. Core I/O
4. Power cord retention bracket
5. Dual-grid 2N redundant power inputs
6. Hot-swap redundant fans
7. 15 Hot-plug PCI-X slots

At A Glance

HP Integrity rx7640 Server Product Number (base system)
AB312A

Standard System Features

- HP UX 11i v3 and HP UX 11i v2 operating system
- Microsoft Windows Server 2008 for Itanium-based systems
- Linux RHEL AS 5 and AS 4 and SLES 10 SP 1. Mad9M rx7640 configuration not supported.
- OpenVMS V8.3 1H1 or higher (for Montvale). Mad9M rx7640 configurations not supported.
- One External Ultra320 LVD SCSI channel (a second Ultra320 SCSI port is available if a Smart Array card is used to access internal disk drives)
- Four internal SCSI controllers
- Two GbE LAN ports (with auto speed sensing)
- Management Processor technology with Integrated LAN console
- 100Base T Management LAN for LAN console
- Rack mountable into HP 19 inch cabinets (factory or field integration)
- Rack mountable into some third party cabinets
- One or Two hardware partitions (nPartitions)
- Factory integration of CPUs, memory, disk drives, removable media drives, and I/O cards
- HP site planning and installation
- One year warranty with next business day on site service response
- Owner's Guide and General Usage media set

HP Integrity rx7640 Server Flexible Advantage Starter (FAST) Configurable Bundles

HP Integrity rx7640 Server Flexible Advantage Starter (FAST) **Configurable Bundles**

The **F**lexible **A**dvantage **ST**arter base systems for the HP Integrity rx7640 Server allow for faster configurations due to the semi configured system bundles. Configurations built from FAST base systems will have substantially lower prices than systems built from the parts.

HP Integrity rx7640 Server FAST Configurable Bundles

Product Number*	Number of dual core Itanium processors	Number of Cell Boards in bundle	Number of Core I/O Cards in bundle
AB447A	2 (2P/4C)	1	1
AB448A	4 (4P/8C)	1	1
AB450A	8 (8P/16C)	2	1
* Includes base chassis and power supplies.			

Standard Features

Minimum System	• One active core in an Intel Dual core Itanium (1P/2C) processor
	• One processor per cell board (Dual core Itanium only requires one active core per cell board)
	• One cell board
	• 4 GB memory (1 pair of 2 GB DIMMs)
	• One core I/O (included; not configurable)
	• One internal DVD drive for OpenVMS and Windows
	• Two power cords
	• Eight hot plug 33 /66 /133 /266 MHz 64 bit PCI X slots or eight mix of hot plug 64 bit PCI X and PCIe x8 IO slots with adaptive signaling technology

Maximum Server Capacities	• Eight Intel Dual core Itanium (8P/16C) processors
	• Four processors per cell board
	• Two cell boards
	• 256 GB memory (16 pairs of 8 GB DIMMs)
	• Two core I/O
	• Four power cords, providing 2N power and dual grid support
	• Four internal hot plug LVD SCSI disks
	• One half height removable media bay. Configure with one DVD+RW or one DAT (or optionally, two slimline DVD devices)
	• 16 hot plug 33 /66 /133 /266 MHz 64 bit PCI X slots or 16 mix of hot plug 64 bit PCI X and PCIe x8 IO slots with adaptive signaling technology)

Standard System Features	• HP UX 11i v3 and HP UX 11i v2 operating system
	• Microsoft Windows Server 2008 for Itanium-based systems
	• Linux RHEL AS 5 and AS 4 and SLES 10 SP 1. Mad9M rx7640 configuration not supported.
	• OpenVMS V8.3 1H1 or higher (for Montvale). Mad9M rx7640 configurations not supported.
	• One External Ultra320 LVD SCSI channel (a second Ultra320 SCSI port is available if a Smart Array card is used to access internal disk drives)
	• Four internal SCSI controllers
	• Two GbE LAN ports (with auto speed sensing)
	• Management Processor technology with Integrated LAN console
	• 100Base T Management LAN for LAN console
	• Rack mountable into HP 19 inch cabinets (factory or field integration)
	• Rack mountable into some third party cabinets
	• One or Two hardware partitions (nPartitions)
	• Factory integration of CPUs, memory, disk drives, removable media drives, and I/O cards
	• HP site planning and installation
	• One year warranty with next business day on site service response
	• Owner's Guide and General Usage media set

Standard Features

High Availability
- N+1 Hot swap cooling
- Redundant and hot swap power supplies
- Cell Hot plug (implemented as dynamic nPars in HP UX 11i v3)
- Hot plug disks
- 2N power inputs (redundant line cords/dual power grid support)
- On line memory page deallocation
- ECC protected SyncDRAM memory
- Full parity protection of data and address buses
- On chip CPU cache with ECC protection
- Double Chip Spare
- Dynamic Processor resilience and deallocation (CPU deallocation on failure)
- On line addition and replacement of PCI I/O cards
- UPS power management
- Three independent Ultra320 buses to internal disks for mirroring across disks and controllers
- Journal file system (HP UX)
- Auto reboot
- On line diagnostics and system health monitor
- Microsoft Cluster Services for Microsoft Windows Server 2008
- HP StorageWorks Software for HP Integrity Servers running Windows Server 2008. Includes Cluster Extension XP and EVA, Continuous Access, Business Copy and SQL Server Fast Recovery
- HP OpenVMS Cluster Software

Security
- Separate console LAN port for system management
- Password protection on console port
- Disablement of remote console ports

Internet Server Functions
- Internet server (inetd)
- Domain name server
- Routing (OSPF, BIND, RIP, EGP, HELLO, gateD)
- Network Time Protocol

Client Configuration Services
- Automatic configuration for printers, PCs, workstations, and X terminals (DHCP, Bootp, tftp, rbootp)

Optional Web Services
- Netscape Communication Server
- Netscape Navigator

Email
- Mail, MailX, ELM
- Sendmail, MIME, SMTP, ESMTP

Remote Access Services
- Telnet, ftp, anonymous ftp server

Configuration

The HP Integrity rx7640 Server is a symmetrical multiprocessing (SMP) server supporting up to eight high performance Intel dual core Itanium processors (90XX series or 91XXN series). Earlier single core "Mad9" processors are supported with certain limitations. The server supports HP's innovative sx2000 chip set. The rx7640 can be configured as a single SMP server or divided into two smaller, hardware partitioned (nPars), logical servers.

Cell Boards

A minimum of one and a maximum of two cells can be ordered in an HP Integrity rx7640 Server. Each cell can be purchased with up to four active Intel dual-core Itanium processors (90X0 series or 91X0N series) or in combination with Instant Capacity processors. The rx7640 can support a mix of 90X0 and 91X0N series processors; however, within a single cell, all processors must be identical

The HP Integrity rx7640 and HP Integrity rx8640 servers share the same cell board. The rp7410/rp7420/rx7620 cell boards cannot be carried forward to the rx7640 server.

Cell Details

- 4 processor slots (supporting up to eight processor cores with dual core)
- HP sx2000 cell controller
- 16 DDR 2 Memory DIMM slots
- DC DC Power converters
- Manageability and Processor Dependent Hardware Circuitry

Cell Board Configuration Rules

- Cell boards are ordered individually
- Minimum: 1 cell board; Maximum: 2 cell boards
- Cell slots 0 or 1 must be loaded first
- Recommended Cell board loading order: 0,1

Cell Board and Processor Mixing Rules

- Cannot Mix Montecito processors with Mad9M on same cell board
- Cannot Mix Montecito processors with Mad9M in same partition
- Cannot Mix Montecito processors with Montvale processors on same cell
- Cannot Mix Montecito processors with Montvale processors in same partition
- Cannot Mix Montecito 1.4GHZ with Montecito 1.6GHZ on same cell board or in the same partition
- Cannot Mix Montecito 12MB with Montecito 18MB or 24MB on same cell board or in same partition
- Cannot Mix Montecito 18MB with Montecito 12MB or 24MB on same cell board or in same partition
- Cannot Mix Montecito 24MB with Montecito 12MB or 18MB on same cell board or in same partition
- Cannot Mix Montvale 1.4GHZ with Montvale 1.6GHZ on same cell board or in the same partition
- Cannot Mix Montvale 12MB with Montvale 18MB or 24MB on same cell board or in same partition
- Cannot Mix Montvale 18MB with Montvale 12MB or 24MB on same cell board or in same partition
- Cannot Mix Montvale 24MB with Montvale 12MB or 18MB on same cell board or in same partition

NOTE: If slower speed processor is installed on cell (1.4 with 1.6) the slowest speed will be used

Intel Dual-core Itanium Details

Configuration

• 1.6 GHz • Level 3 cache: 24 MB • Level 2 cache: 1 MB instr + 256 KB data • Level 3 cache: 16 KB instr + 16 KB data • Single bit cache error correction • 44 bit physical addressing • 64 bit virtual addressing • 4 GB maximum page size • Intel Itanium 9150N (Montvale)	• 1.6 GHz • Level 3 cache: 18 MB • Level 2 cache: 1 MB instr + 256 KB data • Level 3 cache: 16 KB instr + 16 KB data • Single bit cache error correction • 44 bit physical addressing • 64 bit virtual addressing • 4 GB maximum page size • Intel Itanium 9140N (Montvale)	• 1.4 GHz • Level 3 cache: 12 MB • Level 2 cache: 1 MB instr + 256 KB data • Level 3 cache: 16 KB instr + 16 KB data • Single bit cache error correction • 44 bit physical addressing • 64 bit virtual addressing • 4 GB maximum page size • Intel Itanium 9120N (Montvale)

Processor Configuration Rules

- The Intel dual core Itanium processor consists of two processor cores. You may order and upgrade a dual core Itanium processor in increments of one core (the second core in a processor being iCAP).
- There must be at least one processor core active (the other core being iCAP) on each cell board.
- On each cell board, processors must be installed in the following sequence 0, 2, 1, 3
- HP Integrity rx7620 1.6 GHz 6 MB level 3 cache processors may be carried forward to rx7640 servers.
- Intel single core Itanium processors (now obsoleted) and Intel dual core Itanium processors can be mixed in the same chassis as long as they are in separate hard partitions (requires the same chipset, sx1000 or sx2000).

Memory Configuration

The memory DIMMs used in the HP Integrity rx7640 Server are sold in pairs and are custom designed by HP. Each DIMM contains DDR II chips with full ECC protection. DIMM sizes of 2 GB, 4 GB, and 8 GB are supported. Each HP Integrity rx7640 Server cell board supports up to 16 DIMM slots and 16 GB/s of peak memory bandwidth. HP 9000 rp7410/rp7420/rx7620 memory modules cannot be carried forward to the rx7640 server.

The HP Integrity rx7640 and HP Integrity rx8640 servers share the same 4 GB, 8 GB, and 16 GB memory products.

HP Integrity rx7640 Server Memory DIMMs

Memory Module size (Pairs)	rx7640 Product Numbers	HP Integrity rx7640 Server Maximum Capacity Using a single DIMM Size	Single DIMM Size
4 GB	AB454A	64 GB	2048 MB
8 GB	AB455A	128 GB	4096 MB
16 GB	AB456A	256 GB	8192 MB
Bundle size	**rx8640 Product Number**	**Equivalent Memory Module**	**Single DIMM Size**
128 GB (16 x 4GB)	AH411A	Qty 16 of AB455A	4096 MB
128 GB (8 x 8GB)	AH412A	Qty 8 of AB456A	8192 MB
256 GB (32 x 4GB)	AH413A	Qty 32 of AB455A	4096 MB
256 GB (16 x 8GB)	AH414A	Qty 16 of AB456A	8192 MB

Configuration

Memory Loading Rules	
	● Memory must be installed in pairs - modules (2 DIMMs of equal density)
	● Memory modules (pairs of DIMMS) are available in three densities: 4 GB (2×2048MB), 8 GB (2×4096MB), and 16 GB (2×8192MB).
	● Memory bundle product numbers consist of DIMMS already qualified in the memory modules.
	● Minimum memory is 2 GB per cell
	● Maximum memory per system is 256 GB-using sixteen 16 GB memory modules (8 GB pairs) per system.
	● Larger DIMMs must be loaded first across a cell, followed by progressively smaller DIMM sizes.
	● On each cell board, Memory Pairs must be installed in the following order: (0A, 0B), (1A, 1B), (2A, 2B), (3A, 3B), (4A, 4B), (5A, 5B), (6A, 6B),(7A, 7B)
	● DIMM mixing other than recommended configurations is supported as long as the memory loading rules are followed

rx7640 Recommended Memory Configurations

Memory per Cell (GBs)	Number of DIMMs			Quad Echelon							
	2 GB	**4 GB**	**8 GB**	**2**	**1**	**3**	**0**	**2**	**1**	**3**	**0**
				OA, OB	**1A, 1B**	**2A, 2B**	**3A, 3B**	**4A, 4B**	**5A, 5B**	**6A, 6B**	**7A, 7B**
4	2			2 GB							
8	4			2 GB	2 GB						
16	8			2 GB	2 GB	2 GB	2 GB				
32	16			2 GB	2 GB	2 GB	2 GB	2 GB	2 GB	2 GB	2 GB
32		8		4 GB	4 GB	4 GB	4 GB	2 GB	2 GB	2 GB	2 GB
64		16		4 GB	4 GB	4 GB	4 GB	4 GB	4 GB	4 GB	4 GB
64			8	8 GB	8 GB	8 GB	8 GB	4 GB	4 GB	4 GB	4 GB
128			16	8 GB	8 GB	8 GB	8 GB	8 GB	8 GB	8 GB	8 GB

Performance Tuning Guidelines	
	● For best performance, a cell should be configured with a multiple of eight DIMMs or four pairs (although the server will execute properly with an odd number of pairs). It takes eight DIMMs to populate both memory buses. Populating only one of the two memory buses on a cell board will deliver only half the peak memory bandwidth.
	● Load memory equally across the available cell boards.

Memory Latencies	
	There are two types of memory latencies within the HP Integrity rx7640 Server:
	1. Memory latency **within** the cell refers to the case where an application either runs on a partition that consists of a single cell or uses cell local memory.
	2. Memory latency **between** cells refers to the case where the partition consists of two cells and cell interleaved memory is used. In this case 50% of the addresses are to memory on the same cell as the requesting processor, and the other 50% of the addresses are to memory of the other cell.
	The HP Integrity rx7640 Server average memory latency depends on the number of CPUs in the partition. Assuming that memory accesses are equally distributed across all cell boards and memory controllers within the partition, the average idle memory latency (load to use) is as show below:

Configuration

Number of processors Per Partition	Average Memory Latency
4- processor (single cell)	~185 ns
8- processor (two cell)	~249 ns

I/O Architecture

Components within the I/O subsystem are the I/O controllers, internal peripheral bay, and multifunction Core I/O. The figure below shows the basic block diagram of the I/O subsystem. The HP Integrity rx7640 Server I/O architecture utilizes industry standard PCI X, and PCI-express buses in a unique design for maximum performance, scalability, and reliability. To achieve maximum performance and availability, each PCI/PCI-X slot on the I/O board is controlled by its own Bus Converter ASIC and is also independently supported by its own half of the dual hot swap controllers. All PCI slots are designed to be compliant with PCI Rev.2.2, PCI-X Rev.2.0a, and PCI-express Gen1 specifications.

The PCI-X 2.0 I/O Backplane implemented an important change to power distribution to the I/O partitions. The PCI-X Power supply bricks have been redesigned to allow the pair of them to be N+1 redundant in operation. Both I/O partitions will sustain their operational state even if one of the PCI bricks has failed. All the PCI voltages will remain within the PCI specification. These power bricks are not part of the PCI-X I/O board assembly. They plug into the edge of the PCI-X I/O Backplane to provide power to the board and they are not backwards compatible with the previous PCI power bricks. Any PCI brick failures will be reported to the system so the failing brick could be hot swapped.

Two different IO expansion bays are supported in the rx7640 chassis:

BP1: PCI-X IO BAY:
The PCI-X board is two logically independent I/O circuits (or partitions) on one physical board: Escalante 0 and its associated eight Gemini ASICs, Core I/O 0 and 8 PCI-X expansion slots form PCI-X I/O Partition 0. Escalante 1 and its associated eight Gemini ASICs, Core I/O 1 and 8 PCI-X expansion slots form PCI-X I/O Partition 1.

BP2: Combined PCI-X / PCI-e IO BAY:
The PCI-Express board comprises two logically independent I/O circuits (partitions) on one physical board: Escalante 0 and its associated four Gemini (PCI-X) , four Apollo (PCIe) ASICs, and their respective PCI/PCI-X/PCIe slots form PCI-Express I/O Partition 0 + Core I/O. Escalante 1 and its associated four Gemini (PCI-X) , four Apollo (PCIe) ASICs, and their respective PCI/PCI-X/PCIe slots form PCI-X I/O Partition 1 + Core I/O.

The internal peripheral bay supports up to four low profile disks and one removable media device (one removable media device can be configured with one DVD+RW or one DAT (or optionally, two slimline DVD modules). The internal disks are electrically divided into two pairs. SCSI controller chips located on each core I/O board set supports each pair of internal disks. This means that you must have both core I/O board sets in order to access both halves of the peripheral bay.

QuickSpecs

Configuration

PCI Backplane

The HP Integrity rx7640 Server supports both PCI X 2.0 and PCI Express. Two different backplanes are available. The PCI X 2.0 backplane (AB160A) supports sixteen (16) PCI X slots. A combination PCI Express/PCI X 2.0 backplane (AD161A) supports eight (8) PCI X slots and eight (8) PCI Express slots. AD161A is not supported as an upgrade to earlier rx7640 models configured with Intel Itanium Mad9M series processors.

Each backplane contains two master I/O controller chips located on the backplane. Each I/O controller contains sixteen high performance 12 bit wide links, which connect to sixteen slave I/O controller chips supporting the PCI X or PCI Express card slots and core I/O. Two links, one from each master controller is routed through the crossbar backplane and is dedicated to core I/O. The remaining thirty links are divided among the sixteen I/O card slots. This one card per link architecture leads to greater I/O performance and higher availability. Each controller chip is also directly linked to a host cell board. This means that at least two cell boards, located in cell slots 0 and 1, must be purchased in order to access all sixteen I/O card slots. With one cell board, access to eight slots is enabled.

Eight of sixteen I/O card slots are supported by dual high performance fat links. Each link is capable of ~2 GB/s of bandwidth. Six of the sixteen I/O card slots are supported by dual high-performance links. Each link is capable of providing 1060 of bandwidth. This means that half of HP Integrity rx7640 Server I/O slots are capable of sustained 2.12 GB/s. Aggregate I/O slot bandwidth is ~23 GB/s. In addition, because each I/O slot has a dedicated bus, any slot can be "hot plugged" or serviced without affecting other slots. The hot plug operation is very easy, and can be done with minimal training and effort.

I/O Card Description	Product Number	Operating Environment				Special Notes
Mass Storage Adaptors		HP-UX	Win	Linux	Open VMS	
PCI-X 2-port U320 SCSI HBA	A7173A	Y	Y	Y	Y	
PCI-X 2-port Fiber Channel 2Gb HBA for Windows 64-bit (cannot be factory integrated with AD167A or AD168A)	AB466A		Y			
PCI-X 1-port Fiber Channel 2Gb HBA for Windows 64-bit (cannot be factory integrated with AD167A or AD168A)	AB467A		Y			
PCI-X 266 1-Port Fiber Channel 4Gb HBA	AB378B	Y			Y	
PCI-X 266 2-Port Fiber Channel 4Gb Host Bus Adapter	AB379B	Y	Y	Y	Y	
PCI-X 266 1-Port Fiber Channel 4Gb Host Bus Adapter	AB429A		Y	Y		
PCI-X 1-port Fiber Channel 4Gb HBA	AD167A		Y	Y		
PCI-X 2-port Fiber Channel 4Gb HBA	AD168A		Y	Y		

Configuration

PCIe 1-Port Fiber Channel 4Gb Host Bus Adapter	A8002A		Y	Y		
PCIe 2-Port Fiber Channel 4Gb Host Bus Adapter	A8003A		Y	Y		
PCIe 1-Port Fiber Channel 4Gb Host Bus Adapter (Emulex	AD299A	Y			Y	
PCIe 2-Port Fiber Channel 4Gb Host Bus Adapter (Qlogic)	AD300A	Y	Y	Y	Y	
PCIe 2 port Fiber Channel 4-Gb HBA (Emulex)	AD355A	Y			Y	
PCIe 1-Port Fiber Channel 4Gb Host Bus Adapter (Qlogic)	AE311A		Y	Y		
HP PCIe 2-port 4x DDR Fast IB HCA	AH304A	Y				

I/O Card Description	Product Number	Operating Environment				Special Notes
Mass Storage Adaptors - Smart Array		HP-UX	Win	Linux	Open VMS	
SmartArray E500 SAS HBA	AH226A		Y	Y		Battery pack is not supported at this time. Windows maximum 8; Linux maximum 4.
SmartArray 6402/128MB cache controller with factory integrated internal RAID 1 array	AB362A		Y	Y		Must be ordered with two (2) indentical HDD in the hard partition. AB338A cables are included Max (1) per partition
SmartArray 6404/256MB cache controller with factory integrated internal RAID 1 array	AB363A		Y			Must be ordered with two (2) indentical HDD in the hard partition. AB338A cables are included Max (1) per partition
SmartArray 6402/128MB cache controller	A9890A	Y	Y	Y	Y	Max (8) any combination of A9890A + AB262A. For OpenVMS, max (2) per partition Order AB363A for SmartArray 6404 controller with factory integrated internal RAID
SmartArray 6404/1256MB cache controller	A9891A	Y	Y		Y	Max (8) any combination of A9891A + AB263A. For OpenVMS, max (1) per partition Order AB363A for SmartArray 6404 controller with factory integrated internal RAID
SmartArray P600/256MB cache controller	337972-B21		Y	Y		Max (8) For external storage only

Configuration

512MB cache memory upgrade for SmartArray P600, 6402, and 6404	372538-B21	Y	Y	Y	Y	No factory integration
SmartArrayPCIe P800 SAS RAID controller	AD335A	Y	Y	Y	Y	OpenVMS maximum 8.
HP PCIe SC44Ge SAS Host Bus Adapter	AH303A	Y		Y	Y	Max (8)
SmartArray E500 SAS HBA	AH226A		Y	Y		Battery pack is not supported at this time. Windows max (8); Linux max (4)
SmartArray Internal RAID cables	AB338A		Y	Y		Includes two (2) cables One (1) cable required per SmartArray controller for field installation of internal RAID

I/O Card Description	Product Number	Operating Environment				Special Notes
		HP-UX	Win	Linux	Open VMS	
Local Area Network (LAN) Adapters						
HP PCI X 2-port 1000Base SX (optical) Gigabit Adapter	A7011A	Y	Y	Y	Y	Intel chip.
PCI X 1000Base T dual port	A7012A	Y			Y	Intel chip.
PCI X 1000Base T dual port	A9900A		Y	Y	Y	Intel chip.
HP PCI X 4 port 1000Base T Gigabit Adapter	AB545A	Y			Y	OpenVMS max (3) per partition
HP PCI-X 1-port 1000Base-T	AD331A	Y			Y	
HP PCI-X 1-port 1000Base -SX	AD332A	Y			Y	
HP PCI-X 266MHz. 10GigE SR (half height PCI-X card)	AD385A	Y	Y	Y	Y	HP UX maximum 4; Linux maximum 2; OpenVMS maximum 4 per partition.
PCIe 2-port 1000Base T GbE	AD337A	Y	Y	Y	Y	HP-UX max (8); Windows max (12); Linux max (8); OpenVMS max (8) per partition. OpenVMS boot not supported
PCIe 2-port 1000Base SX GbE	AD338A					HP-UX max (8); Windows max (12); Linux max (8); OpenVMS max (8) per partition. OpenVMS boot not supported
HP NC364T PCIe 4-port 1000Base-T Gb Adapter	AD339A	Y			Y	No OpenVMS boot support
HP PCIe 10Gbe SR card	AD386A	Y				

Configuration

HP PCIe 1 port 8 Gb FC SR (QLogic) HBA	AH400A	Y	Y			
HP PCIe 2 port 8 Gb FC SR (QLogic) HBA	AH401A	Y	Y			
HP PCIe 1 port 8 Gb FC SR (Emulex) HBA	AH402A	Y	Y			
HP PCIe 2 port 8 Gb FC SR (Emulex) HBA	AH403A	Y	Y			

I/O Card Description	Product Number	Operating Environment				Special Notes
Mass Storage (LAN) I/O Combination Adapters		HP-UX	Win	Linux	Open VMS	
PCI X 1000Base-SX / 2G Fibre Channel combo	A9782A	Y			Y	OpenVMS maximum 4 per partition.
PCI X 2 port U320 SCSI/2 port 1000Base T adapter	AB290A	Y			Y	OpenVMS maximum 2 per partition.
PCI X 1000Base T GigE/1 port 4G FC combo	AD193A	Y			Y	
PCI X 1000Base T GigE/2 port 4G FC combo	AD194A	Y			Y	
PCIe 4-Gb Fibre Channel/GbE T HBA combo	AD221A	Y			Y	For HPUX, only HPUX v3 supported today.
PCIe 2-port 4-Gb Fibre Channel/2-port Gbe T HBA combo	AD222A	Y			Y	For HPUX, only HPUX v3 supported today.
PCIe 2-port 4-Gb Fibre Channel/2-port Gbe-SX HBA combo	AD393A	Y			Y	For HPUX, only HPUX v3 supported today.

Configuration

I/O Card Description	Product Number	Operating Environment				Special Notes
Wide Area Network (WAN) Adapters		HP-UX	Win	Linux	Open VMS	
2-port programmable serial interface (X25/Frame Relay/SDLC)	J3525A	Y				Order appropriate cable (RS-232-C; V.35; X.21/V11; RS-499; or RS-530 Must order at least one appropriate software products
X.25/9000 SW Media	J2793B	Y				
SNAplus2 Link Server LTU	J6380AA	Y				Required for use with any of the SNAplus2 software products
SNAplus2 Enterprise Extender	J6378AA	Y				Order one per processor core
SNAplus2 APPN Node Server LTU	J6382AA	Y				Order one per processor core
SNAplus2 3270/3179G Server LTU	J6383AA	Y				Order one per processor core
SNAplus2 RJE Server LTU	J6384AA	Y				Order one per processor core
SNAplus2 API Server LTU	J6385AA	Y				Order one per processor core
TN3270 System LTU for Servers and Workstations	J6381AA	Y				Order one per processor core

I/O Card Description	Product Number	Operating Environment				Special Notes
Serial Multiplexer Products		HP-UX	Win	Linux	Open VMS	
HP PCI 8-port serial mux adapter	AD278A	Y				
HP PCI 64-port serial mux adapter	AD279A	Y				Min 1, max 4 port modules AD280A and/or AD281A is required. AD280A and AD281A port modules can be intermixed.
HP 16-port RS-232 RJ45 port module	AD280A	Y				Power supplies required for third and fourth modules connected to AD279A
HP 16-port RS-232 DB25 port module	AD281A	Y				Power supplies required for third and fourth modules connected to AD279A

Cluter Interconnect

Configuration

I/O Card Description	Product Number	Operating Environment				Special Notes
Cluter Interconnect		HP-UX	Win	Linux	Open VMS	
PCI X 2 port 4x Infiniband Fabric Host Channel Adapter	AB286C	Y				

Remote Manageability and Graphics/USB Cards

I/O Card Description	Product Number	Operating Environment				Special Notes
Remote Manageability and Graphics/USB Cards		HP-UX	Win	Linux	Open VMS	
HP Lights Out Advanced KVM	AD307A	Y	Y	Y	Y	HP UX, Linux, OpenVMS support USB only - no VGA support. Maximum 1 per partition.
HP USB/VGA PCIK adapter	A6869B	Y	Y	Y	Y	HP UX, Linux, OpenVMS support USB only - no VGA support. Maximum 1 per partition

Integrity Integrated Lights Out (iLO-2) Management Processor Functionality for sx2000-based Servers

Lights-Out remote management port with both HP 9000 command line interface and new iLO-2 web GUI interface. iLO-2 standard features are part of the iLO-2 management processor. iLO-2 advanced features are added with optional PCI card per managed partition (option AD307A).

Standard Features:

- Password protected console ports
- Console mirroring between all local, modem, LAN, and web consoles
- Remote power up and power down control, per OS partition
- Configurable remote access control
- Interface to system monitoring and diagnostic hardware via an internal IC bus
- System Event logs and event notification to system console-Provides connectivity, information, and support for HP UX tools (such as STM and EMS) to notify by email, pager and/or HP response centers.
- Integration with HP management tools such as Systems Insight Manager
- Secure Sockets Layer security on web console
  (LDAP is not yet available for this product)

Advanced Features, available through Integrity Lights Out Advanced / KVM card (option AD307A)

- Physical VGA/USB 2.0
- Integrated Remote Console (virtual Keyboard Video Mouse)
- Virtual Media USB 1.1
  Card provides one physical VGA port and two physical USB ports, should be used instead of graphics/USB option A6869A. One card should be installed in each nPar where additional management features are required. Card cannot be used in systems without iLO-2 management processor firmware installed.

AD307A card Integrated Remote Console (virtual Keyboard Video Mouse) and virtual Media (read-only CD/DVD/ISO file) support per OS:

Configuration

Operating System	Integrated Remote Console (vKVM)	Virtual Media
HP UX	not supported	supported
Windows	supported	supported
Linux	not supported	not supported
OpenVMS	not supported	supported

VGA port is supplied by an ATI ES1000 controller. Supported resolutions and refresh rates include:

Operating System	Refresh Rate	Maximum Resolution
Windows	75 Hz	640x480
Windows	75 Hz	800x600
Windows	75 Hz	1024x768
Windows	75 Hz	1280x1024
Windows	60 Hz	1600x1200

External Server Storage Connectivity

HP has the broadest, most robust server and storage line-up in the industry, providing exactly the right fit for every need. Refer to the Storage-Server matrix to see a matrix that highlights which storage device, server and operating system is interoperable.

Integrated Multifunction Core I/O

The HP Integrity rx7640 Server chassis supports up to two core I/O board sets. Each board set contains two cards (MP/SCSI and LAN/SCSI), which are installed in different locations. MP/SCSI cards are installed along the right rear vertical edge of the chassis. The LAN/SCSI cards are installed in the PCI card bay. The first core I/O board set will support up to two cell boards in the server and all I/O slots. For support of two hard partitions or for support of the third and fourth integrated disk drive, a second core I/O board set is required in the host system.

HP Integrity rp7410/rp7420/rx7620 Core I/O cards cannot be carried forward to the HP Integrity rx7640 server.

Both Core I/O board sets are identical. The "primary" and "secondary" Core I/O LAN/SCSI board is supported by a 530 MB/s link. In addition, in the "primary" core I/O, a SCSI controller from both the LAN/SCSI board and MP/SCSI board each support a single internal disk drive.

Each HP Integrity rx7640 Server core I/O board set provides the following features:

- Management Processor: The management processor (MP), located on each MP/SCSI card, is a dedicated processor that simplifies and extends system management, and also enhances serviceability. The MP minimizes or eliminates the need for the system administrator to be physically at the system to perform tasks such as diagnostics, system management, or even hard resets. Here are some of the features enabled by the HP Integrity rx7640 Server management processor:
  - System management over the Internet or Intranet (telnet or web)
  - System console redirection
  - Console mirroring
  - System configuration for automatic restart
  - Viewing history log of system events
  - Viewing history log of console activity
  - Setting MP inactivity timeout thresholds
  - Remote system control
  - Remote power cycle (except for MP housekeeping power)
  - Viewing system status
  -
  -

Configuration

- o Event notification to system console, e mail, pager, and/or HP Response Centers
- o Automatic hardware protection of critical environmental problems
- o Access to management interface and console(s) on LAN failure (modem required)
- o Remote resetting of hardware partitions
- o Forward progress indicator (Virtual front panel)
- o Out of band Manageability and PDC firmware update
- o Configure manageability and console security
- o SSL
- External Management LAN port: 10/100Base T LAN port using an RJ 45 connector.
- One External SCSI ports: Ultra320 LVD SCSI port for connections to mass storage or media. (A second U320 external port only available when internal drive off of LAN/SCSI is connected to Smart Array).
- Two External 1GbE LAN ports.
- Access to internal peripheral bay: The HP Integrity rx7640 Server internal peripheral bay is located at the top front of the system chassis. The peripheral bay holds up to four low profile hot plug disks and one half height removable media device (One half height bay supports two devices in the case of optional slim line DVD's). Each HP Integrity rx7640 Server core I/O board set contains dual channel Ultra320 SCSI controller chips that support the SCSI devices in the internal peripheral bay. Each core I/O board set supports two internal disks. It is important to note that separate controllers and SCSI busses manage the two disks supported by the primary and secondary core I/O set (This is a change from the previous architecture in sx1000 based servers). If use of more than two internal disks is needed, the HP Integrity rx7640 Server will require both core I/O sets.

Core I/O Loading Rules

- Minimum of one Core I/O board set (primary) must be purchased with each HP Integrity rx7640 Server
- Load the Primary (1) MP/SCSI board into slot 1 and the LAN SCSI board into I/O cabinet 1 (slot 8).
- MP/SCSI slot 0 and I/O cabinet 0 corresponds to Cell Board slot 0. MP/SCSI slot 1 and I/O cabinet 1 corresponds to Cell Board slot 1.
- A cell board must be installed in slot 0 to enable use of Core I/O 0. Likewise, a cell board must be installed in slot 1 to enable use of Core I/O 1.
- Access to two internal disk drives and one half height removable media bay is enabled with the installation of the first Core I/O board set (Primary).
- The optional second Core I/O board set (secondary) must be ordered to enable hardware partitioning
- The optional second Core I/O board set (secondary) must be ordered to enable access to the third/fourth internal disks
- The optional second core I/O board set (secondary) must be ordered to enable using the optional slim line DVD's.

Internal Disk Drives   HP Integrity rx7640 Server supports up to four internal low profile hot plug disk drives.

Internal Disk Drive Specifications

Product Number	Disk Capacity	Rotational speed	Average seek time (read/write)	Sustained Bandwidth
AD147A	73 GB	15,000 RPM	3.6 msec (read); 3.9 msec (write)	75 MB/s
AD210A	146 GB	15000 RPM	3.6 msec (read); 3.9 msec (write)	75 MB/s
AD265A	300 GB	15000 RPM	3.6 msec (read); 3.9 msec (write)	75 MB/s

HP Integrity rp7410/rp7420/rx7620 disk drives can be carried forward to the HP Integrity rx7640 server.

Configuration

For HP UX:

- Supported by MirrorDisk/UX across disk drives, controllers, and core I/O boards
- Must order the second Core I/O board set to support more than two internal disk drives

For Windows:

- An rx7640 customer need only order AB362A 0D1 in order to receive an SA6402 Smart Array card cabled and configured for RAID 1 mirroring in the factory. The AB362A product includes both the SA6402 Smart Array Card (A9890A) and the internal RAID cables (AB338A).
- An rx7640 customer need only order AB363A 0D1 in order to receive an SA6404 Smart Array card cabled and configured for RAID 1 mirroring in the factory. The AB363A product includes both the SA6404 Smart Array Card (A9891A) and the internal RAID cables (AB338A).
- The customer is limited to maximum of one AB362A or AB363A per partition.
- The customer may order additional Smart Array controllers as add in cards for connection to external storage devices. When these products are ordered with option 0D1 they will be installed, but will not be connected to the internal HDDs. The supported Smart Array products (for external storage) on rx7640 are:
  - A9890A - SA6402
  - A9891A - SA6404
  - 337972-B21 - SA P600

Internal Removable Media	- HP Integrity rx7640 Server contains one half-height removable media bay, which will support either a DVD+RW or DAT 72 drive or two slimline DVD+RW drives. Removable media drives are not hot plug capable.
	- DVD+RW drive provides enhanced features while preserving backward read compatibility with CD ROM. Data transfer rates of up to 6.75 MB/s are achieved with the DVD format; 4.8 MB/s can be achieved with the CD format.
	- A DVD drive is required for all OpenVMS and Windows configurations.
	- DAT drive has a maximum storage capacity of 72 GB with a peak transfer rate of 21.6 GB/hour compressed.
	- HP Integrity rp7410/rp7420/rx7620 removable media drives can be carried forward to the HP Integrity rx7640 servers

Internal Removable Media Specifications

Product Number	Device	Capacity	Data transfer rate
AB351B[1]	DVD+RW		
AB400A	DAT	72 GB	
AD013A[2]	Two slimline DVD+RW		

[1]Third party software (not included with AB351B) is required to support DVD write capability with Windows.
[2]The slimline DVD's require the second core I/O set.

I/O Configuration Rules The following table summarizes previously mentioned configuration rules pertaining to usage of I/O slots and internal peripherals.

Configuration

Configuration	Minimum Requirement	
	Minimum Number of Cells	**Minimum Number of Core I/Os**
>7 I/O card slots or access to both I/O card bays	2	1
>2 internal disks or access to both pairs of disks	2	2
1 Internal half height Removable Media	1	1
2 Hard Partitions	2	2
2 Internal slim line DVD's	2	2

External Storage

HP has the broadest, most robust server and storage line up in the industry, providing exactly the right fit for every need. Refer to the Storage-Server matrix to see a matrix that highlights which storage device, server and operating system is interoperable.

AC/DC Power

DC Power Supplies
The HP Integrity rx7640 Server comes with two power supplies that provided dual grid (2N) protection. The hot swap design allows for the replacement of a failed power supply without interrupting server operation. All four power cords must be utilized to fully enable power supply hot swap. HP Integrity rp7410/rp7420/rx7620 DC power supplies can be carried forward to the HP Integrity rx7640 server

PCI Power Supplies
PCI power supply is now a redundant N+1 design. One PCI power supply failure will not affect the I/O bay since the remaining PCI power supply will power both I/O bays (this is an upgrade from the sx1000 based systems). PCI power supplies are hot swap capable (this is an upgrade from the sx1000 based systems). HP Integrity rp7410/rp7420/rx7620 PCI Power Supplies cannot be carried forward to the HP Integrity rx7640 server.

AC Power
The HP Integrity rx7640 Server contains four C20 power receptacle ports located at the bottom rear bulkhead. A minimum of two power cords must be used to maintain normal operation of the HP Integrity rx7640 Server. A second set of two cords can be added to improve system availability by protecting, for example, against power grid failures, accidentally tripped circuit breakers, or a failed power supply. The HP Integrity rx7640 Server hardware is capable of receiving AC input from two different AC power sources. The objective is to maintain full equipment functionality when operating from power source A and power source B or A alone or B alone. This capability is called "fault tolerant power compliance".

Although many HP Integrity rx7640 Server configurations can be sufficiently powered from a single 16 /20 amp branch circuit, the optimum configuration is to use one 16 amp (minimum) branch circuit per power cord. Due to the variety of 16/20 plugs used throughout the world, the HP Integrity rx7640 Server Ordering Guide offers a choice of plug options.

AC Power Consumption
The HP Integrity rx7640 Server power consumption will vary greatly depending on the hardware configuration and the input line voltages supplied at customer sites. Because of the disparity of line voltages throughout the world it's best to represent power consumption in VA (Volt Amperes). With power consumption being of high concern throughout the world, it's necessary to specify consumption in a couple of different ways.

Maximum Theoretical Power: or "Maximum Configuration" (Input power at the ac input expressed as Volt-Amps to take into account Power factor correction.)
The calculated sum of the maximum worst case power consumption for every subsystem in the

Configuration

server. This number will NEVER be exceeded by a functioning server for any combination of hardware and software under any conditions.

Marked Electrical Power: (Input power at the ac input expressed as Volt-Amps.)
The server Marked Electrical Power is the rating given on the chassis label and represents the input power required for facility ac power planning and wiring requirements. This number represents the expected maximum power consumption for the server based on the power rating of the bulk power supplies. This number can safely be used to size ac circuits and breakers for the system under all conditions.

Typical Maximum Power: or User Expected Maximum Power, "Typical Configuration" (Expressed as Volt-Amps.)
The measured maximum worst case power consumption. This number represents the larges power consumption that HP engineers were able to produce for the server with any combination of hardware under laboratory conditions using aggressive software applications designed specifically to work the system at maximum load. This number can safely be used to compute thermal loads and power consumption for the system under all conditions.
For further power consumption details, see the HP Integrity rx7640 Installation manual.

Configuration	**HP Integrity rx7640 Server Fully Loaded Configuration**

- 8 Intel Dual core Itanium processors or 1.6 GHz Single core Itanium processors
- 256 GB of memory
- 14 PCI cards
- 2 cell boards
- 4 internal hard drives
- 1 DVD drive
- 2 core I/O board sets
- 2 bulk power supplies.
- Typical maximum power: 2171 VA (2128 W) (10.9 A @ 200 VAC across two cords)
- Marked Electrical for the server: 2640 VA (12A @ 220 VAC across two cords)
- Marked Electrical per line cord: 1320VA (6A @ 220 VAC across each cord)
- Maximum Theoretical Power: 3231 VA (3166 W)

Power Distribution Units	**60-amp Power Distribution Unit-**

- AF916A (NA/JPN) and AF917A (International) - supported in 10KG2 rack
- E7683A (US) and E7684A (International) - supported in Rack System E

Customers who prefer the fewest higher amperage connections from their ac line current source to the HP Integrity rx7640 Server can use the 60 amp power distribution unit (PDU). The AF916A & AF917A PDU's contain 12 C19 outlets. The E7683A & E7684A PDU's contain 8 C19 outlets. For more details on PDU's, please see PDU sales collateral. This PDU is sold separately and can be ordered with any HP server solution.

The maximum amperage is 60 amps through the entire PDU and 20 amps per breaker. Both limits must be met. If each 60 amp PDU can support up to four HP Integrity rx7640 servers if the PDU is not mounted in the same rack. Up to three HP Integrity rx7640 servers can be supported if the PDU is mounted within the same rack.

For redundant power inputs, the second set of cords is added. If the second PDU is plugged into a second grid this configuration provides protection against:

Configuration

- Losing power from a single power grid
- Accidental tripping of one or two circuit breakers
- Accidental disconnect of a single PDU power cord
- Accidental disconnect of up to four (two from each system) system power cords

30 amp Power Distribution Unit-

- 252663 D75 (NA/JPN) and 252663 B33 (International)-supported for 10K G2 rack
- E7681A (North America/JPN) and E7682A (International)-supported with Rack System E

A 30 amp Power Distribution Unit (PDU) is also supported with HP Integrity rx7640 Server. Rack configurations consisting of peripherals and only one HP Integrity rx7640 Server will likely be best supported with the 30 amp PDU. This PDU is sold separately and can be ordered with any HP server solution.

Unlike the 60 amp PDU, each 30 amp PDU can only support one HP Integrity rx7640 Server. The following configuration guidelines apply when using the 30 amp PDU:

- A0 and A1 or B0 and B1 cords should never be plugged into the same PDU
- Use two 30 amp PDUs to achieve input power redundancy (plugging A0/A1 and B0/B1 into separate PDUs).
- Ordering tools will not force the purchase of a second PDU for input power redundancy. A second PDU must be manually selected if redundant input power is desired.

Partitioning

A hardware partition corresponds roughly to a single, standalone system. Each HP Integrity rx7640 Server can be subdivided into two partitions, each containing one cell that has minimal shared resources with the other cell (partition). Special programmable hardware in the cells defines the boundaries of a partition in such a way that the isolation is enforced from the actions of other partitions. Each partition runs its own independent instance of the operating system (HP UX 11i v3 and HP-UX v2, Windows, Linux, or OpenVMS). Applications cannot span partitions since each partition runs its own instance of the OS, essentially functioning as a stand alone server. However, different partitions may be executing the same or different revisions of an operating system, or they may be executing different operating systems altogether (such as HP UX, Windows, Linux, or OpenVMS), with OS availability.

Each partition has its own independent CPUs, memory and I/O resources consisting of the resources of the cells that make up the partition. Resources may be removed from one partition and added to another without having to physically manipulate the hardware just by using commands that are part of the System Management interface. With a future release of HP UX, using the related capabilities of dynamic reconfiguration (e.g. on line addition, on line removal), new resources may be added to a partition and failed modules may be removed and replaced while the partition continues in operation.

Partitioning the resources of the complex in this way makes it easy to run multiple application environments on the same physical system; you can allocate physical resources and tune the operating system running on each partition depending on the needs of the application (or the most important application) you intend to run on it. Alternatively, you can configure the HP Integrity rx7640 Server as a single partition, allowing all the resources to be focused on a single set of tasks, for example a large online transaction processing application.

You can increase or reduce the processing power of a partition by adding or deleting cells (at this release, you must shut down the operating system running on the affected partition(s) before moving cells, and before configuration changes will take effect). Though the OS might include commands for some configuration tasks, HP recommends you use the Partition Manager (parmgr) to configure partitions.

Configuration

The current release of HP Integrity rx7640 Server/HP UX 11i v2 supports hardware partitioning. Hardware based partition configuration changes may require a reboot of the partition depending upon the configuration change. The reboot of the partition only affects the partition that is being reconfigured. The other partition defined in the chassis is not affected and will continue to execute without interruption. In a future HP UX release, dynamic hard partitions will be supported. Dynamic partitions imply that partition configuration changes do not require a reboot of the partition.

The HP Integrity rx7640 Server can be divided into two independent hardware partitions. In a partitioned configuration, system resources such as cell boards, I/O slots, core I/O, and disks, are evenly split between the two partitions (the removable media device is dedicated to partition 1). There is no flexibility to otherwise divide these components. For example, it is not possible to include 12 I/O slots in partition 0 and 4 I/O slots in partition 1; the split must be even.

The table below summarizes the resource split between hardware partitions.

	Cells (required)	**I/O slots**	**Core I/O** (required)	**Disk/Media Bays**
Partition 0	Cell 0	7	1	2/0
Partition 1	Cell 1	7	1	2/1

Software Partitioning

HP Integrity rx7640 servers support virtual partitioning (vPars) to the single processor level similar to support on HP 9000 servers with HP UX 11i v1. With vPars, a user will be able to support up to four separate virtual partitions each with an instance of HP UX within each hard partition. VPars will provide many of the features of nPars but without the electrical isolation and support for hardware failures that nPars provides.

HP Virtual machines is supported on the rx7640 server. HP Virtual Machines:

- increases server utilization
- enables server consolidation
- provides rapid deployment of new environments (a requirement for test and development environments)
- enhances the HP Virtual Server Environment by providing soft partitioning with shared I/O, sub-CPU granularity, and built-in dynamic resourcing for all Integrity servers

HP System Insight Manager

HP Systems Insight Manager (SIM) is the central point of administration for management applications that address the Integrity rx7640 and rx8640 servers management requirements. HP SIM delivers powerful monitoring and control, notifying the administrator of potential hardware or software problems before they occur. It also provides inventory-reporting capabilities that dramatically reduce the time and effort required to track server assets. HP SIM provides secure communications as well as role-based security to make certain that its powerful capabilities are kept secure from unauthorized users.

HP-UX

- For most updated HP-UX information please see: www.hp.com/go/hpux
- HP Integrity Essentials for HP-UX 11i are advanced plug-ins to HP SIM that provide modular, integrated system management software for complete HP Integrity server management. It integrates with many other HP-UX-specific system management tools, including the following tools available on Integrity servers
- Ignite-UX addresses the need for HP-UX system administrators to perform fast

Configuration

deployment for one or many servers. It provides the means for creating and reusing standard system configurations, enables replication of systems, permits post-installation customizations, and is capable of both interactive and unattended operating modes.

- Software Distributor-UX (SD-UX) is the HP-UX administration toolset used to deliver and maintain HP-UX operating systems and layered software applications. Delivered as part of HP-UX, SD-UX can help you manage your HP-UX operating system, patches, and application software on HP Integrity servers.
- System Management Homepage (SMH) is used to manage accounts for users and groups, perform auditing and security operations, and handle disk and file system management and peripheral device management. HP Systems Insight Manager allows these tasks to be distributed to multiple systems and delegated using role-based security.
- HP-UX Kernel Configuration is used for self-optimizing kernel changes. The new HP-UX Kernel Configuration tool allows users to tune both dynamic and static kernel parameters quickly and easily from a Web-based GUI to optimize system performance. This tool also sets kernel parameter alarms that notify you when system usage levels exceed thresholds.
- Partition Manager creates and manages nPars for high-end servers. After the partitions are created, the systems running on those partitions can be managed consistently with all the other tools integrated into SIM.
- HP-UX 11i Webmin-based Admin is a Web-based system management framework that allows a wide variety of open source Webmin system management modules to be plugged in. HP supports this tool for the configuration of the HP-UX 11i Apache-based Web Server and the HP-UX 11i Tomcat-based Servlet Engine.
- HP-UX Bastille is a security hardening/lockdown tool that enhances the security of an HP-UX 11i UNIX® host. It accommodates the various degrees of hardening required of servers used for webs, applications, and databases.
- Security Patch Check efficiently improves systems security by performing analysis of file sets and patches installed on an HP-UX 11i system and generating a report of recommended security patches.
- System Inventory Manager is for change and asset management. It enables you to easily collect, store, and manage inventory and configuration information for HP-UX-based servers. It provides an easy-to-use, web-based interface, superior performance, and comprehensive reporting capabilities.
- Event Monitoring Service (EMS) keeps the administrator of multiple systems aware of system operation throughout the cluster, and it notifies the administrator of potential hardware or software problems before they occur. HP Systems Insight Manager can launch the EMS interface and configure EMS monitors for any node or node group that belongs to the cluster, resulting in increased reliability and reduced downtime.
- HP Process Resource Manager (PRM) controls the resources that processes use during peak system load. PRM can manage the allocation of processor, memory resources, and disk bandwidth. It allows administrators to run multiple mission-critical applications on a single system, improve response time for critical users and applications, allocate resources on shared servers based on departmental budget contributions, provide applications with total resource isolation, and dynamically change configuration at any time-even under load.
- HP-UX Workload Manager (WLM) provides automatic processor resource allocation and application performance management based on prioritized service level objectives (SLOs). In addition, WLM allows administrators to set real memory and disk bandwidth entitlements (guaranteed minimums) to fixed levels in the configuration. The use of workload groups and SLOs improves response time for critical users, allows system consolidation, and helps manage user expectations for performance.
- HP OpenView Operations Agent provides a fully integrated, single-pane-of-glass management solution for systems, networks, applications, and databases. A powerful ability to monitor, filter, correlate, and respond to events enables IT organizations to

Configuration

establish central management control over their managed environments and improve overall availability and reliability.

- HP OpenView Performance Agent monitors and analyzes the performance of systems and applications to compare SLOs with actual application performance, and it enables real-time performance monitoring as well as action on alarm.
- HP OpenView Glanceplus is a powerful system monitoring and diagnostic tool that provides online performance information, examination of system activities, identification and resolution of performance bottlenecks, and system fine-tuning.
- HP OpenView Data Protector (Omniback II) provides reliable, high-performance data protection for enterprise-wide heterogeneous environments without impacting system or application performance. It centralizes and automates backup and recovery operations and tracks file versions and media to enable swift recovery of information.
- HP OpenView Network Node Manager (NNM) management station runs on Itanium based HP UX servers. NNM provides a powerful network management solution that includes concise, in depth views of network devices and their status in an intuitive graphical format. NNM helps network managers evaluate network performance, pinpoint problem sources, and proactively manage their networks and network availability.

All other HP OpenView management tools, such as HP OpenView Operations, Service Desk, and Service Reporter, will be able to collect and process information from the agents running on Integrity servers with HP-UX.

Windows

Windows offers Windows Server 2008 for Itanium Systems. Please note that the last order date for Windows Server 2003 is Feb 28, 2009. HP will continue to ship WS 2003 SKUs till March 31, 2009. However, Microsoft provides downgrade rights for the customers to downgrade from Windows Server 2008 to Windows Server 2003. The latest offering is Windows Server 2008 for Itanium-based systems. The HP Integrity Essentials Foundation Pack for Windows is a complete toolset for installing, configuring, and managing HP Integrity rx7640 and rx8640 Servers running Windows. The following tools are included in the package:

- Smart Setup CD includes an EFI-based setup utility designed for easy server and array controller configuration. The CD also includes all the latest tested and compatible drivers, HP firmware, HP utilities, and HP management agents that assist in the server deployment process (by preparing the server for installation of a standard Windows operating system) and in the ongoing management of the server.
- System Management Homepage for HP Integrity servers with Windows helps system administrators rapidly respond to potential and actual system failures, increases system stability, and reduces troubleshooting complexity. It provides consolidated information about system health and configuration through a simple, web-based user interface. All system faults and major subsystem status are reported within the System Management Homepage. The System Management Homepage is accessible directly through a browser or through a management application such as System Insight Manager or an enterprise management application.
- Microsoft Windows System Resource Manager (WSRM) provides resource management and enables the allocation of resources, including processor and memory resources, among multiple applications based on business priorities. An administrator sets targets for the amount of hardware resources that users or running applications are allowed to consume. This means resources can be allocated among multiple applications on a server according to business priorities.
- HP OpenView management tools, such as HP OpenView Operations and Network Node Manager, will be able to collect and process information from the SNMP agents and WMI running on Itanium based Windows servers, proactively monitoring and measuring the

Configuration

availability and performance of heterogeneous servers and applications from a services perspective and a Windows management platform. In the future, OpenView agents will be able to directly collect and correlate event, storage, and performance data from Itanium based Windows servers, enhancing the information HP OpenView management tools will process and present.

Linux

- The HP Integrity Essentials Foundation Pack for Linux is a set of one DVD and one CD that includes tools for server install, configure, and manage the Integrity rx7640 and rx8640 servers as a part of an adaptive infrastructure.
- The Smart Setup CD contains the latest documentation, firmware, and tools that assist in the server deployment process by preparing the server for installation of the Linux operating systems. This EFI-based setup utility application assists with tasks such as configuring storage adapters, upgrading firmware, preparing a system hardware inventory, and installing diagnostics tools.
- HP Integrity Essentials Foundation Pack for Linux also includes one Management DVD to assist in the on going server management tasks. These DVD and CD contain the complimentary HP value added software that aid in remotely diagnosing and monitoring system resources, and storage attached to the system. This software includes:
  - HP Insight Management Agents,
  - WBEM providers
  - System Management Homepage
  - HP System Insight Manager
- System Management Homepage provides a consolidated view of system hardware health, configuration, performance and status information for individual HP servers. Included with the HP Integrity Essentials Foundation Pack for Linux, the System Management Homepage is a secure web-based application that helps systems administrators respond rapidly and proactively to potential and actual system failures, increasing system stability and reducing troubleshooting complexity. It provides a consolidated view of all system health, in-depth instrumentation and configuration data, and simplifies access to HP web-enabled management tools that include the Insight Management Agents, Software Version Control Agents and the Array Configuration Utility.
- The HP Systems Insight Manager is a core management element of the Integrity Essentials Foundation Pack that is also included on the Management DVD. This application gathers and organizes raw system management agent information that enables operators to more effectively monitor system usage and troubleshoot system problems. Customer benefits include greater system uptime, quicker problem resolution, and lower cost of ownership for your Integrity and ProLiant servers.
- Serviceguard Manager can monitor and manage Serviceguard on Linux and HP-UX 11i clusters from a single point. It provides a GUI to administer HP Serviceguard, Serviceguard Extension for RAC, Metrocluster, and Continentalclusters and to display their status.

OpenVMS

- Factory installed software
- Partition Manager creates and manages nPartitions-hard partitions for high end servers. Once the partitions are created, the systems running on those partitions can be managed consistently with all the other tools integrated into HP Systems Insight Manager. See "Partitioning" for more information.
- OpenVMS Management Station to manage user accounts, printers, and disks
- Availability Manager for real time performance monitoring
-

Configuration

- Global Workload Manager (gWLM)-Global Workload Manager provides automatic CPU resource allocation and application performance management based on prioritized service level objectives (SLOs).
- Class Scheduler for resource management
- HP Systems Insight Manager (see above) in conjunction with (Web) Management Agents
- Central Management Server - CMS - Management agent for gWLM
- OpenView Operations Agent-collects and correlates OS and application events (fee based)
- OpenView Performance Agent-determines OS and application performance trends (fee based)
- OpenView Data Protector (Omniback II)-backs up and recovers data (fee based)

Instant Capacity (iCAP-For HP UX and OpenVMS only (Windows and Linux are currently not supported)

Racking

The HP Integrity rx7640 Server was designed to provide industry leading performance density and availability when ordered in a racked configuration. At 10 EIA units (17.5 inches), four HP Integrity rx7640 servers can be mounted into a single HP two meter cabinet (HP 10K G2 Universal rack).

The HP Integrity rx7640 Server industrial design and packaging was designed to allow easy and quick access to all of the system's components. The most frequently handled devices, removable media and disks, are directly accessible at the system's front. By removing the front bezel, hot swap fans, hot swap power supplies, and PCI power supplies can be completely serviced. At the rear, core I/O and more hot swap fans are directly accessible. For access to all other components, the rack mounted HP Integrity rx7640 Server comes with rack sliders.

These rack sliders enables the HP Integrity rx7640 Server to be slid forward out of the HP cabinet for servicing of internal components such as fans, cell boards, and I/O cards, while the system is still running. The sliders also allows for servicing or replacement of any FRU (field replaceable unit) without removing the chassis from the cabinet. The HP Integrity rx7640 Server industrial design and slider strategy enables access and removal of any FRU within 15 minutes or less. This design feature minimizes the downtime associated with system upgrades in the rare event of a component failure. Also included with ever rack mounted HP Integrity rx7640 Server is a cable management arm (CMA) The CMA neatly secures data cables and prevents cables from becoming entangled while servicing of the system.

UPS

Management of local UPSs for the rx7640 and rx8640 is now through a LAN port on the core I/O card. Management of UPSs by the predecessor, rx7620 and rx8620 servers was through a serial port on the core I/O. The serial port is not available on the rx7640 and rx8640 servers. Therefore, when upgrading or adding rx7640 and rx8640 servers to your environment and using local UPSs (as opposed to datacenter wide UPSs), make sure there is a LAN management card available on the local UPS.

Configuration

HP 10000 and 9000 Racks (These racks are the pre-merger Compaq racks)

The HP 9000 and HP Integrity servers are supported for field installs into these racks. Factory integration is not yet supported for HP 10000 and HP 9000 racks. Differing depth requirements of the HP 9000/HP Integrity racking kits preclude racking HP 9000/HP Integrity servers and HP ProLiant servers in the same racks.

Refer to the 10000 G2 Series Rack Best Practices Guide for Information on rack deployment, stabilization, and transportation. Go to http://h18004.www1.hp.com/products/servers/platforms/rackandpower.html for more information.

When field racking for the mid-range servers in any rack (10K G2, System E or third-party), the customer will have t order the appropriate service product (HA124A1 option 570 - HP Startup Field Racked Mid Server Service).

For further details, refer to the racking solutions subchapter in the configuration guide.

Third-Party Racking

HP Servers are designed to maximize performance density when installed into HP Rack Systems. HP system Rack Systems maintain the high level of safety and reliability of HP Server solutions that customers have come to expect. Although HP strongly recommends racking servers in HP Rack Systems, it is recognizes that some customer circumstances may prohibit this. For those customers, HP has developed a set of guidelines that when followed, enables server installations into third-party cabinets. It is extremely important that the guidelines be followed due to the wide variety of cabinets in the market place.

Upgrades

The rx7640 server is capable of in-box upgrades from rx76xx/rp74xx servers.

You can also accomplish an upgrade by combining the purchase of a new server with Trade-Up credits on the older server. Box swap upgrades may have the advantage of less upgrade down time.

In-box upgrades and box swap upgrades may have similar prices depending on the amount of memory and number of cell boards and processors that have to be upgraded.

Included in the in-box Upgrade Kit (AD057A):

- System Backplane-The rx7640 System backplane is a new design with the following feature modifications:
  - New high speed differential links
  - Redesign of the crossbar ASIC
  - Additional switch fabric on the backplane
  - Redesign of the backplane power subsystem
  - Redesign of the system clock infrastructure
  - New high speed, impedance controlled, board to board connectors will be used
- Mass Storage Backplane PCA- The mass storage subsystem upgrades from SCSI SE interconnect to U320.

Other Miscellaneous

- Nameplates and labels
- "Read Me" documents, Upgrade Guide, CD ROM
- Miscellaneous cables

Must Order Separately for an in-box upgrade:

- Processor -(Unless already have supported processor)
- Cell boards- New Cell board design to support new chipset and future Itanium CPU
- I/O Backplane-The I/O backplane must be ordered
- Memory DIMMs-The memory system uses Double Data Rate DRAMs (DDR II)
- Core I/O - U320 support
- Installation services

Material which may be reused in an In box Upgrade:

- Chassis
- System fans
- 1.6-GHz, 6MB cache single core Itanium processor modules (Madison9M)
- AC power distribution PCA
- DC power distribution PCA
- OL* PCA (I/O cards)
- Bulk power supplies
- Hard disk drives
- Removable media drives
- Supported I/O Cards (please refer to supported I/O card list)

Technical Specifications

Server Model Number	rx7640	
	Number of 1.6GHz/24MB Dual core Itanium Processors	1-8
	Number of 1.6GHz/18MB Dual core Itanium Processors	1-8
	Number of 1.4GHz/12MB Dual core Itanium Processors	1-8
	Chipset	**HP sx2000**
	Server Product Number (Base system)	**AB312A**

Fast Bundles (All include base chassis and power supplies. Fast Bundles do not include memory, storage, or I/O backplane.)

Product Number	Number of Processor cores	Number of Cell Boards in bundle	Number of core I/O Cards in bundle	Number of Power Supplies
AB447A	4	1	1	2
1.4 GHz Itanium 9120N (Montvale) processor 12 MB cache				Option 004
1.6 GHz Itanium 9140N (Montvale) processor 18 MB cache				Option 005
AB448A	8	1	1	2
1.4 GHz Itanium 9120N (Montvale) processor 12 MB cache				Option 004
1.6 GHz Itanium 9140N (Montvale) processor 18 MB cache				Option 005
AB450A	16	2	1	2
1.4 GHz Itanium 9120N (Montvale) processor 12 MB cache				Option 004
1.6 GHz Itanium 9140N (Montvale) processor 18 MB cache				Option 005
All cache is L3. All processors include Floating Point Coprocessor				

Memory	Memory slots	32 (16 per cell board)
	Min memory module (1pair of 2GB DIMMs)	4 GB
	Maximum memory capacity	256 GB (128 GB per cell board)

Internal Disks	Maximum disk mechanisms	4
	Maximum disk capacity	1.2 TB
	Internal Removable Media (1 half height)	1 slot
	DVD+RW(1 half height device or 2 slimline devices)	
	DDS 72 DAT	72 GB

Technical Specifications

Core I/O (Items per core I/O set)	Ultra320 SCSI	2
	NOTE: Second SCSI port only available if Smart Array controller is used for internal disks.	
	1 GbE (RJ-45 connector)	2
	10/100Base-T port (LAN console connection)	1
	RS-232 Management Console port	1

I/O Buses and Slots	**Total hot plug PCI-X Slots** (266 MHz; 64 bits)	16
	Either BP1 config: 16 PCI-X slots (8 @ 266Mhz, 8 @ 133Mhz) or BP2 config: 8 PCI-X slots @ 133Mhz + 8 PCI-e slots @ 266Mhz)	

Maximum I/O Cards (See supported I/O table for specific products)	Mass Storage	15
	LAN	2-15
	WAN	15
	Multi-Function (Mass Storage / LAN)	15
	Additional Interface Cards	4-15

Electrical Characteristics	AC Input power	200-240V 50/60 Hz
	Hot swap Power supplies	2 total, included with base
	Redundant AC power inputs	2 required, 4 cords for 2N
	Typical maximum power dissipation for maximum CPU, memory, disk, I/O configurations	2171 VA (2128 W) 10.9A @200VAC
	Marked Electrical for server	2640 VA (12A @220VAC)
	Marked Electrical per line cord	1320 VA (6A @220VAC)
	Power factor at full load	0.98 (approximately)

Site Preparation	kW rating for UPS loading*	3.0
	Site planning and installation included	Yes
	Depth (in/mm)	30 in (762 mm)
	Width (in/mm)	19 in (482 mm)
	Height (in/mm/EIA) Racked	17.5 in (445 mm)/10 units
	Weight (lb/kg)	101.6 kg (224 lbs)

* Represents theoretical maximum power/heat dissipation under worst case conditions, may increase with future upgrades

Technical Specifications

Environmental Characteristics	Regulatory Model	RSVLA-0102
	Acoustics (sound power)at 25° C	7.4 Bels LwA
	Acoustics (sound power)at 30° C	7.4 Bels LwA
	Acoustics (operator/bystander) at 24° C	58.4 dB LpA
	Operating Temperature (up to 5000 ft)*	5° to 32° C (41° to 89° F)
	Non-operating Temperature	-40° to 158° F (-40° to 70° C)
	Maximum rate of temperature change	68° F (20° C)/hour
	Operating relative humidity	15% to 80%, non-condensing, max. web bulb = 78.8° F (26° C)
	Non-operating relative humidity	5% to 80%, non-condensing
	Operating altitude above sea level	To 10,000 feet (3.0 km)
	Non-operating altitude above sea level	To 15,000 feet (4.5 km)

* Maximum operating temperature range up to 5000 ft. For higher altitudes derate the max temperature by 1°C/1000 ft above 5000 ft.

Regulatory Compliance	Regulatory Model Number	RSVLA-0102
	Electromagnetic Interference	Complies with FCC Rules and Regulations, Part 15, as a Class A digital device. Manufacturer's Declaration to EN55022 Level A, VCCI Registered, Class 1, Korea RLL.
	Safety	CSAus Certified, compliant with EN 60950